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ANALYTICAL ABSTRACTS OF CURRENT LITERATURE.

Verlauf Der Grönland-Expedition der Gesellschaft für Erdkunde. DR. ERICH VON DRYGALSKI. Verhandlungen der Gesellschaft für Erdkunde zu Berlin, 1893, Nos. 8 u. 9.

This article is mainly a sort of itinerary with little geological detail. The glacial investigations referred to were carried on chiefly on the mainland east of Disco. The author emphasizes the fact that the surface of the inland sea near its edge is much dissected by valleys cut by surface streams, and that there are upon the ice many pools and little lakes due to melting of the ice beneath patches of dust. In the warm season there are many lakes about the border of the ice held in on one side by the ice. With the first sharp cold the ice cracks so as to let the water escape. The author's microscopic study failed to discover any essential difference in structure between glacial ice and lake ice, though the fjord ice was somewhat unlike both. Dr. von Drygalski thinks that the contained water alone gives to glacier ice the power of movement, and that, therefore, there is no motion without a melting temperature. It is thought that the melting temperature maintains itself at the bottom of the ice by virtue of the transfer of heat from the upper surface during the melting season. Since the upper part of the ice must be below the melting point during a large part of the year, it is thought that movement depends more on the lower than on the upper layers. The author is doubtful of the truthfulness of the comparison between ice streams and rivers. The temperature of the mass is thought to fluctuate about the freezing point, and its work and motion are thought to depend upon the change from a solid to a fluid condition, and *vice versa*.

R. D. S.

The Geology of Angel Island. F. LESLIE RANSOME. (Bulletin Geological Department of University of California, Vol. 1, No. 7.)

Angel Island is about a square mile in extent, and lies in San Francisco Bay, three and one half miles northeast of San Francisco. The larger portion of the island is occupied by the San Francisco sandstone, which contains an abundance of plagioclase and other non-quartzose fragments. Interbedded with the sandstone are numerous masses of jaspery rock elsewhere denominated "bedded jaspers," but the discovery of an abundance of remains of

siliceous organisms makes the term "radiolarian chert" more applicable. Both sandstone and chert have been locally metamorphosed by the invasion of eruptive rocks. The term Fourchite is doubtfully applied to an intrusive sheet or sill invading the San Francisco sandstone, some portions of it consisting of a breccia, other portions having an imperfect spheroidal structure, while the main body is massive evidently representing a true sill and not an interbedded flow. Bright blue amphibole, with pleochroism of glaucophane is a noticeable feature. It is also remarkably free from the usual accessory minerals of basic eruptive rocks. Alteration along the contact zone has resulted in the development of a glaucophane schist. Serpentine which occurs as a large dike traversing the island from northwest to southeast was derived from a rock composed wholly or mainly of diallage and incloses masses of a gray rock resembling diabase. The glaucophane schists were formed from the San Francisco sandstone by metamorphism. Evidence controverts the view that the radiolarian cherts (bedded jaspers) represent ordinary shales silicified by regional metamorphism. The serpentine is in no sense a metamorphosed sediment. The appendix contains descriptions of radiolarian remains found in the chert.

C. H. G.

Geological Survey of Missouri. Report on the Bevier Sheet. By C. H. GORDON. J. E. TODD and H. A. WHEELER, contributors.
Report on the Iron Mountain Sheet. By A. WINSLOW, E. HAWORTH, and F. L. NASON.

The above reports, issued by the Missouri Survey under the direction of Arthur Winslow, State Geologist, constitute the second and third of the series of sheet reports, of which the Higginsville Sheet was the first. The present reports are issued in large octavo, uniform with the other publications of the survey, instead of the same size as the atlas sheets, as was at first planned. Each sheet comprises an area of one fourth of a square degree. The scale is 1:62500, or about one inch to a mile. The topography is indicated by twenty feet contours. A sheet of cross and columnar sections accompanies each map. The work has evidently been carefully done.

The Bevier sheet comprises the southwestern part of Macon county, with portions of Chariton and Randolph. The topography is due entirely to stream erosion. The rivers have sunk their valleys to a moderate depth in a wide stretching plain, the remnants of which are still well preserved in the broad inter-stream surfaces.

The stratified rocks of the region belong to the Coal Measures series, the deposits of the Middle and Lower stages being represented. Within the state, however, no widely recognizable horizon separating the two has been identified. The strata dip gently to the southwest, but there are local depart-

ures from this dip. Five beds of coal are recognized, two of which—the Bevier and the Mason City beds—can be profitably worked. The former of these is the most important. Its estimated available tonnage within the limits of this sheet is 336,000,000 tons.

The report on the Quaternary geology is by Professor Todd. Three divisions are noted, viz.: 1. Pre-glacial or basal clay, a light gray clay, without northern pebbles, and of no great surface extent. 2. Drift or till. The erratics comprise granites, greenstones, and a red quartzite identical with the Sioux quartzites. The last seems not to be distributed much further east than the area of this sheet. 3. A gray, loamy clay, which is intimately mixed with fine sand, and contains a few well-worn pebbles and calcareous concretions. This formation is McGee's "gumbo." Professor Todd considers it the equivalent of the higher loess into which it appears to grade. Much detailed information is given by Professor Wheeler concerning the economical values of clays and shales of the region.

The rocks present in the area covered by the Iron Mountain sheet are, 1) crystalline, massive Archean rocks, which are divisible into basic eruptives, occurring in the form of dikes, and acid eruptives, including both granites and porphyries; 2) crystalline stratified Algonkian rocks, chiefly conglomerates and slates, including the iron ore bed of Pilot Knob; 3) clastic Paleozoic limestones and sandstones. The economic interest of the region centers chiefly in the iron ores and building stones. Thorough exploration has shown that the Iron Mountain ore deposit is practically exhausted. The same may also be said of the Pilot Knob deposit.

H. B. K.

The Granites of Cecil County in Northeastern Maryland. By G. PERRY GRIMSLEY. (Jour. Cin. Soc. of Nat. Hist., Vol. XVII., Nos. 1 and 2, April, July, 1894. Thesis for Doctorate, Johns Hopkins Univ.)

The rocks of this region are holocrystalline with a northeast strike and a highly inclined dip to the southeast. The rock is of a light color with dark biotite arranged in more or less parallel lines. This foliation runs northeast while the dip is nearly vertical. Toward the gabbro contact on the north the feldspar of the granite is replaced in part by hornblende and biotite along with an increased amount of magnetite. Near the contact, boulders of sheared and squeezed chloritic rock occur, together with dark oval patches of basic constituents. The latter are considered basic segregations rather than inclusions of foreign rock. Other rock types are diorite and staurolitic mica schist.

As a result of dynamic action, old minerals have been more or less metamorphosed and new ones developed, with the production of a secondary foliated structure. Of new minerals epidote is especially well developed. In

the replacement of feldspar by epidote, the host apparently exerts no orienting influence on the epidote as is often stated to be the case. The epidote is often arranged in zones and sometimes is concentrated in a rim within the feldspar individual. The explanation of this is sought in variations of chemical composition within concentric zones of a single feldspar crystal. The alteration of feldspar to muscovite is much less frequent than to epidote.

The staurolitic mica schist separating the areas represents a sedimentary deposit more ancient than the granites and probably owes its highly crystalline character to contact metamorphism.

The study of granite soils with the aid of the miner's pan showed the presence of a number of minerals not noticed in the thin sections.

C. H. G.

Erosion in the Hydrographic Basin of the Arkansas River above Little Rock. By J. C. BRANNER. (An. Rep. Geol. Surv. of Ark., 1891, Vol. II.)

The observations on the erosion in the Arkansas River basin, while not as exhaustive as the State Geologist desired them, owing to limited resources at his command, they nevertheless furnish a valuable addition to the literature on this subject. The physical and chemical character of the sediment is described, and a number of analyses given. The tabulated results of the amount of material carried in suspension and the amount carried in solution for each month in the year are given.

More than twenty-one million tons are carried in suspension and nearly seven million tons, or nearly a third as much in solution. In November during very low water, the amount in solution was six times that in suspension, while in May and June during high water, the amount in suspension was more than five times that in solution. The results are compared in part with those of other rivers.

Other papers in the same volume are Elevations, Magnetic Observations, and Bibliography, by J. C. Branner; Mollusca, by F. A. Sampson; Myriopoda, by C. H. Bollman; Fishes, by S. E. Meek; The Geology of Benton County, by F. W. Simonds and T. C. Hopkins; and Geology of Dallas County, by C. E. Siebenthal.

The Dallas County report is accompanied by a topographic map, and contains a discussion of the topography and the general geologic features; but the chief point of interest is the description of the potter's clays. It contains numerous analyses, a list of the occurrences of the clay deposits and a history of the pottery industry in the county. The pottery clays of other parts of the state, along with the other valuable clays of the state, will be described in a forthcoming volume on clays by the State Geologist.

T. C. H.

The Tertiary Geology of Southern Arkansas. By G. D. HARRIS. (An. Rep. of the Geol. Surv. of Ark., 1892, Vol. II., pp. 207; 1 map.)

All the Tertiary deposits of Southern Arkansas are classed in the Eocene series and subdivided into the Midway, Lignitic, Claiborne, and Jackson stages, using the nomenclature of the neighboring states. These correspond, in part, at least, with the Lafayette formation of McGee and the Orange sands of Hilyard, but Professor Harris prefers, for reason given, not to use these terms. Each of the stages is discussed in detail as to distribution, topography, and organic remains. The oldest known Tertiary deposits in the state are included in the Midway stage and contain a fauna similar to the Midway limestone in Alabama. The Lignitic stage lacks molluscan remains, but fossil leaves are abundant. Molluscan remains are not abundant in the Claiborne stage, but are in the Jackson stage. The Tertiary-Cretaceous border is changed in a number of places from Hill's map in 1888. The Cretaceous is found farther to the northeast than formerly supposed. Seven plates of typical fossils are given and thirty-four figures illustrating the stratigraphy of the area. The purely economic features of the area will be discussed in a future volume of the Survey publications.

T. C. H.